an epitaxial semiconductor substrate having an expitaxial region of silicon included in at least an upper portion thereof; and

a diffusion layer formed in said expitaxial region, by using a dopant ion having a relatively large mass number,

wherein said diffusion layer is formed shallower than said epitaxial region.

3. (Amended) The semiconductor device of Claim 1,

wherein said diffusion layer is formed by using, as said dopant ion, an indium ion.

4. (Amended) The semiconductor device of Claim 1,

wherein said diffusion layer corresponds to a pocket diffusion layer of a MIS semiconductor device, and

said MIS semiconductor device includes:

a gate electrode formed above said epitaxial region with a gate insulating film sandwiched therebetween;

a source/drain diffusion layer of a first conductivity type formed in a source/drain region of said epitaxial region at a distance from a region below a side face of said gate electrode;

an extension diffusion layer of the first conductivity type formed in said epitaxial region between said source/drain diffusion layer and said region below the side face of said gate electrode and having shallower junction than said source/drain diffusion layer; and

said pocket diffusion layer of a second conductivity type formed in said epitaxial region under said extension layer.

5. (Amended) The semiconductor device of Claim 4,

wherein said extension diffusion layer is formed by using an antimony ion as a dopant.

6. (Amended) A semiconductor device comprising:

a semiconductor substrate composed of silicon and having a main surface of {110}-orientation; and

a diffusion layer formed, by using a dopant ion having a relatively large mass number, in said semiconductor substrate.

7. (Amended) The semiconductor device of Claim 6.

wherein said diffusion layer is formed by using, as said dopant ion, an indium ion.

8. (Amended) The semiconductor device of Claim 6,

wherein said diffusion layer corresponds to a pocket diffusion layer of a MIS semiconductor device, and

said MIS semiconductor device includes:

a gate electrode formed above said semiconductor substrate with a gate insulating film sandwiched therebetween;

a source/drain diffusion layer of a first conductivity type formed in a source/drain region of said semiconductor substrate at a distance from a region below a side face of said gate electrode;

an extension diffusion layer of the first conductivity type formed in said semiconductor substrate between said source/drain diffusion layer and said region below the side face of said gate electrode and having shallower junction than said source/drain diffusion layer; and

said pocket diffusion layer of a second conductivity type formed in said semiconductor substrate under said extension diffusion layer.

9. (Amended) The semiconductor substrate of Claim 8,

wherein said extension diffusion is formed by using an antimony ion as a dopant.

Please add new claims 28-38 as follows.

28. (New) The semiconductor device of Claim 3,

wherein said diffusion layer is formed by said indium ion at a dose of 5 x $10^{13}/cm^2$ or more.

29. (New) The semiconductor device of Claim 2,

wherein said diffusion layer is formed by using, as said dopant ion, an indium ion.

30. (New) The semiconductor device of Claim 3,

wherein said diffusion layer corresponds to a pocket diffusion layer of a MIS semiconductor device, and

said MIS semiconductor device includes:

a gate electrode formed above said epitaxial region with a gate insulating film sandwiched therebetween;

a source/drain diffusion layer of a first conductivity type formed in a source/drain region of said epitaxial region at a distance from a region below a side face of said gate electrode;

an extension diffusion layer of the first conductivity type formed in said epitaxial region between said source/drain diffusion layer and said region below the side face of said gate electrode and having shallower junction than said source/drain diffusion layer; and

said pocket diffusion layer of a second conductivity type formed in said epitaxial region under said extension diffusion layer.

31. (New) The semiconductor device of Claim 30,

wherein said extension diffusion layer is formed using an antimony ion as a dopant.

32. (New) The semiconductor device of Claim 1,

wherein said epitaxial semiconductor substrate has a laminated structure including a substrate composed of silicon, and said epitaxial region formed on said substrate by epitaxial growth of silicon.

33. (New) The semiconductor device of Claim 3,

wherein said epitaxial semiconductor substrate has a laminated structure including a substrate composed of silicon, and said epitaxial region formed on said substrate by epitaxial growth of silicon.

34. (New) The semiconductor device of Claim 1,

wherein said diffusion layer is formed by using, as said dopant ion, an antimony ion.

35. (New) The semiconductor device of Claim 7,

wherein said diffusion layer is formed by said indium ion at a dose of $5 \times 10^{13}/cm^2$ or more.

36. (New) The semiconductor device of Claim 7,

wherein said diffusion layer corresponds to a pocket diffusion layer of a MIS semiconductor device, and

said MIS semiconductor device includes:

a gate electrode formed above said semiconductor substrate with a gate insulating film sandwiched therebetween;

a source/drain diffusion layer of a first conductivity type formed in a source/drain region of said semiconductor substrate at a distance from a region below a side face of said gate electrode;

an extension diffusion layer of the first conductivity type formed in said semiconductor substrate between said source/drain diffusion layer and said region below the side face of said gate electrode and having shallower junction than said source/drain diffusion layer; and

said pocket diffusion layer of a second conductivity type formed in said semiconductor substrate under said extension diffusion layer.

37. (New) The semiconductor device of Claim 36,

wherein said extension diffusion layer is formed using an antimony ion as a dopant.

38. (New) The semiconductor device of Claim 6,

wherein said diffusion layer is formed by using, as said dopant ion, an antimony ion.